Section 206. EXCAVATION AND BACKFILL FOR STRUCTURES

206.01 General Description. This work consists of removal of all materials necessary for construction of structures and backfilling of completed structures. Included is all necessary clearing, grubbing, removing old structures or parts thereof, and disposal of excess or unsuitable material according to subsection 205.03.P. The removal of ice, water, or any liquid will not be classified as excavation.

A. **Excavation for Structure Foundations.**

1. **Foundation Excavation.** This work consists of excavation of materials of whatever nature, including portions of the existing structures, encountered within the foundation excavation limits as shown on the plans except rock foundation excavation as defined herein.

2. **Rock Foundation Excavation.** This work consists of excavation of boulders measuring 0.5 cubic yard or more and rock or cemented soil as described in subsection 205.03.B. Rock foundation excavation shall not include those portions of the existing structures that are to be removed.

B. **Backfill.** Place and compact backfill around completed structures. Soil excavated from the site may be used if it meets the material requirements. The material requirements depend on the type of structure to be backfilled.

1. **Bridges, Pump Stations, Retaining Walls and Culverts (other than pipe).** Use granular material Class II. This backfill will be paid for as Backfill, Structure, CIP.

2. **Miscellaneous Structures.** These include all structures other than bridges, pump stations, retaining walls and culverts (other than pipe). Use sound earth unless otherwise specified.

206.02 Materials. Materials shall meet the following requirements.

206.03 Construction.

A. **Foundation Excavation, and Rock Foundation Excavation.** Excavation shall be of adequate size to permit construction of the foundation units. Where shown on the plans or approved, footing excavation shall be trimmed to the exact size of the footing and the footing forms omitted. When concrete is to bear on or against an excavated surface other than rock, the bottom and side surfaces of the excavation shall not be disturbed before placing concrete. Final excavation to grade shall not be made until just before the concrete is to be placed. Concrete shall not be placed until the depth of excavation has been checked and the suitability of foundation support material has been approved. The concrete

shall be placed in the dry. The elevations for the bottom of footings shall be subject to such change, as directed, to ensure a satisfactory foundation. When directed, all unsound material underlying proposed structures shall be removed and replaced with approved material. The surface of all rock or other hard material upon which concrete is to be placed shall be free of all loose fragments, clean and cut to a firm surface. The surface shall be level, stepped or serrated, as directed.

B. **Backfill Placement and Compaction.**

1. Backfill shall not be placed against any portion of the structure until the required curing, surface finishing and waterproofing of such portions have been completed and approved. The inlet of each weep hole shall be covered with geotextile. Upon approval, backfill shall be placed promptly to protect the structure. Backfill around a structure shall be placed to equalize horizontal loadings. All voids not occupied by the new structure or by the specified backfill shall be backfilled with sound earth, or other approved material.

2. **Compacting Backfill.**

a. **Bridges, Pump Stations, Retaining Walls and Culverts (other than pipe).** Backfill material shall be placed in 6-inch layers. Each layer shall be compacted to 100 percent of the Maximum Unit Weight in the load bearing area. The load bearing area is defined as the area within the 1:1 slope down from the outer limits of the bottom of the footing to the bottom of the excavation. All backfill behind and around substructure units bounded by the outer limits of the bottom of the footing and the surface elevation shall be placed in layers not more than 6 inches in depth, and compacted to not less than 95 percent of the maximum unit weight. All backfill between the bottom of footing elevation and the bottom of slope paving subbase shall be placed in layers not more than 6 inches in depth, and compacted to not less than 95 percent of the maximum unit weight. Granular material shall be at a point short of saturation, as determined from the One Point Cone Chart in the *Density Control Handbook*. If the material contains an excess of moisture, it shall be dried to the required moisture content before being compacted.

b. **Miscellaneous Structures.** Backfill shall be placed in 6-inch layers, and compacted to not less than 95 percent of the maximum unit weight. Increased layer thickness may be approved by the Engineer, provided the required compaction is obtained.

206.04 Measurement and Payment.

Contract Item (Pay Item)	**Pay Unit**
Excavation, Fdn	Cubic Yard
Excavation, Rock Fdn	Cubic Yard
Backfill, Structure, CIP	Cubic Yard
Backfill, Structure, LM	Cubic Yard
Aggregate, 6A	Cubic Yard

A. **Excavation.** Unless otherwise provided, excavation for structures shall include all necessary sheeting, shoring, and de-watering.

1. **Excavation, Fdn** will be measured in its original position based on plan quantities. The plan quantities will be determined by the space bounded by the existing ground surface or exposed portions of the existing substructure, the elevation of the bottom of the foundation, and 1:1 slopes extending outward from points 18 inches outside the bottom of the footing, unless otherwise shown on the plans. If piling, not shown on the plans is encountered in **Excavation, Fdn**, piling removed below the bottom of footing elevation will be paid for as extra work.

2. **Excavation, Rock Fdn** will be measured in its original position for the actual amount of rock excavated within vertical planes through the neat lines of the footing. An allowance for overbreak will be made when the nature of the rock is such that it is impractical to excavate to the neat lines of the footing. Allowance will be limited to vertical planes 6 inches outside and parallel to the neat lines of the footing and for a depth of 3 inches below the elevation of the bottom of the footing as shown on the plans. The amount of overbreak will be measured by actual cross sections of the footing excavation.

B. **Backfill.**

1. **Backfill, Structure, CIP** will be plan quantity, regardless of the slope of the foundation excavation. Material placed outside the maximum pay limits shown on the plans will not be included in the plan quantity.

2. When sound earth is used as backfill material for miscellaneous structures, this material will not be paid for separately, but is included in the contract unit prices for other items.

3. **Aggregate, 6A** will be measured by volume, loose measure. The contract unit price is payment for furnishing, hauling and placing the material at locations directed by the Engineer.